The Talbot Manual

Technical Resource

Clutches

Bill Barrott & Martin Bryant

ROESCH TALBOT MANUAL CLUTCHES

By Michael Marshall

These notes relate to the manual clutches fitted to the 14HP 14/45 from 1926 to 1933, models AD, AF, AG, AQ and AU; the 18HP 70s, 75s and 90s from 1930 to 1933, models AO and AM, and the AV105s of 1931 and 1932. They also provide general guidance on the clutches fitted to the earlier models 8/18, 10/23 and 12/30.

GENERAL DESCRIPTION

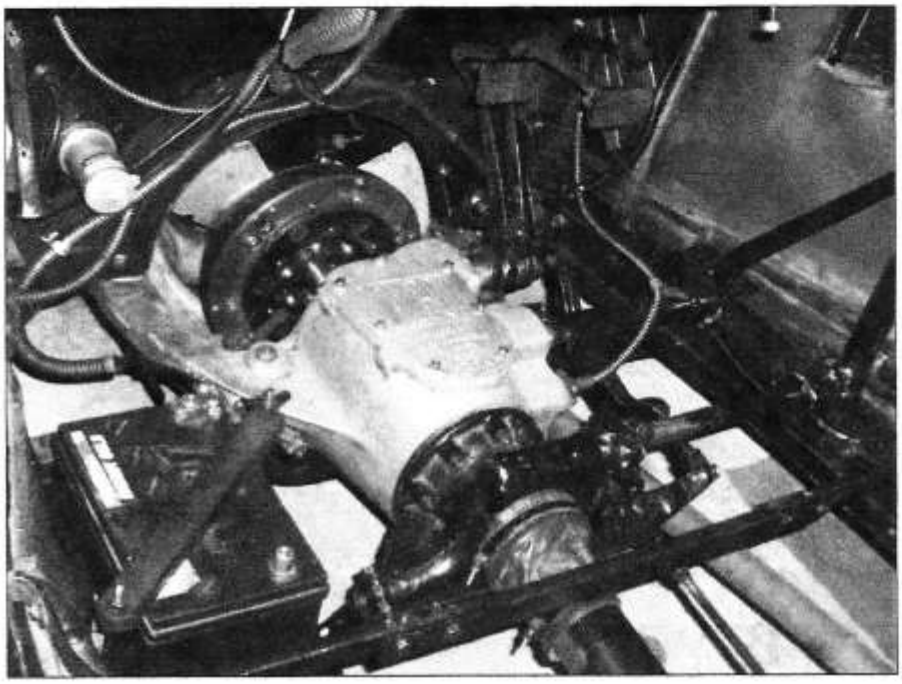

Figure 1: 14HP (Seat and floor removed)

Talbot clutches are recessed into the back of the flywheel. They lie in the open, in a rearward extension of the engine sump between the engine and gearbox (Figure 1), where they are reasonably accessible for lubrication and adjustment once the front floor boards and toe boards are removed.

They are of the single plate type, the friction linings (A) being riveted to the clutch plate (E) which is carried on the splined centre (B), see Figure 2. When engaged to take up the drive the linings are pressed against the flywheel by the pressure plate (F) which is pushed forwards by six coil springs (D). The pressure plate is connected to the back-plate (G) by three leaf springs (C).

Figure 3 and Figure 4 show the arrangement on 14HP cars. The clutch plate is carried on the splines of the gearbox input shaft, supported by two ball bearings: one in the rear of the crankshaft, the other in the front of the gearbox. The pressure plate incorporates a withdrawal sleeve carried by a ball bearing. Foot pressure on the clutch pedal rotates a transverse shaft having a 'claw' with two lobes which engage a lip at the rear of the withdrawal sleeve, pulling the pressure plate to the rear so that the linings are no longer

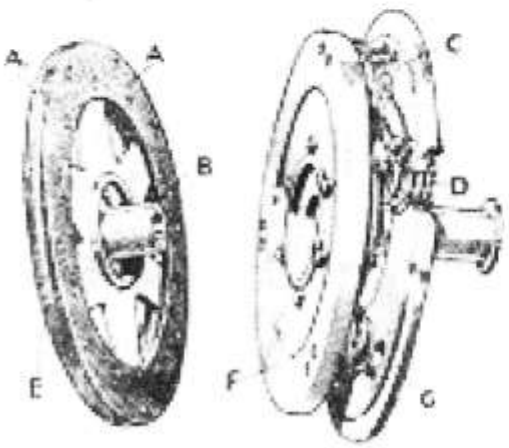

Figure 2: The clutch components.

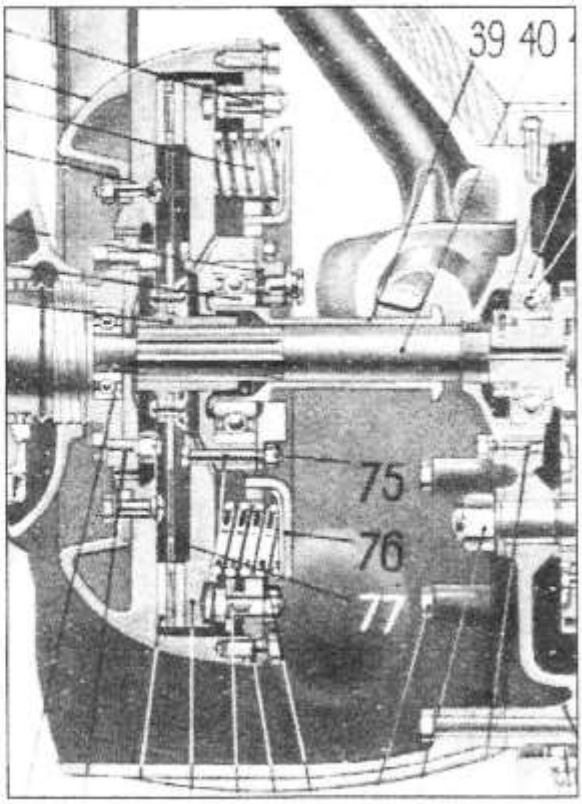

Figure 3: The 14HP clutch.

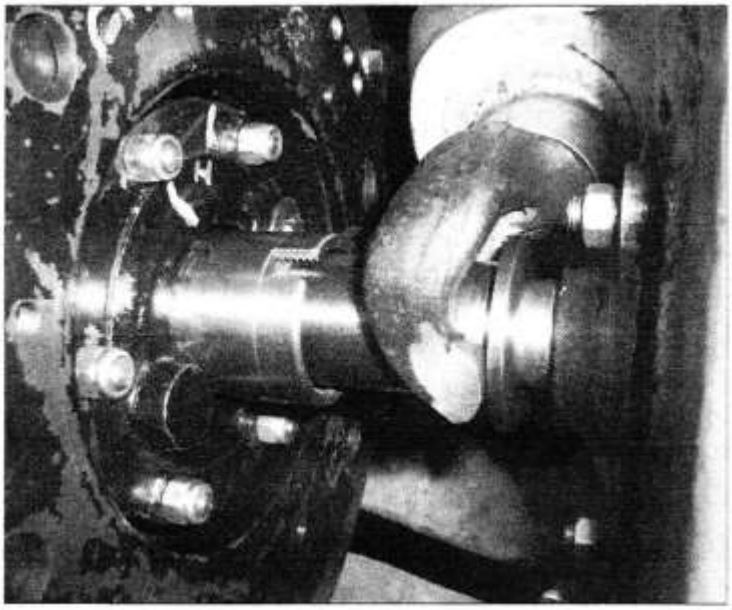

Figure 4: 14HP Clutch actuation.

pressed by the springs between it and the flywheel and disengaging the drive.

The arrangement on the last of the manual 14HP cars, the AUs, the 18HP models, and the early AV105s of 1931 and 1932, was essentially the same; the main difference being the enclosure of the claw of the transverse shaft and of the withdrawal bearing within a forwards extension of the gearbox in order to provide automatic lubrication of these items – also of the input shaft drive splines.

Figure 5 provides a longitudinal view (in which the smaller clutch of the 14HP model AU, with its finned flywheel, is shown in the upper half-section).

NB: The small auxiliary springs located within the thickness of the clutch plate - see A.4.4 - are not shown in any of these Figures.

A.2 – LUBRICATION

The front bearing of the gearbox input shaft is packed with grease on assembly, or may be of the modern sealed type, so requires no attention; also, the rear bearing of the input shaft and the transverse shaft are lubricated automatically by the gearbox. The splines carrying the clutch plate need as, from the AG onwards, they are lubricated by gearbox oil via a drilling in the shaft. On the AD and AF there is no provision for automatic lubrication of the splines, but an occasional greasing, e.g. any time the clutch is removed, seems to be sufficient.

The only item requiring occasional lubrication is the ball bearing carrying the clutch withdrawal sleeve on all 14HPs preceding the model AU. Do not be tempted by the prominent Tecalemit nipple to apply a grease gun, as grease causes too much drag which will lead to accelerated wear of the two lobes of the transverse shaft where they contact the lip of the sleeve. All you need do is unscrew the nipple and put in a few drops of engine oil, say once or twice a year. If re-commissioning one of these models which

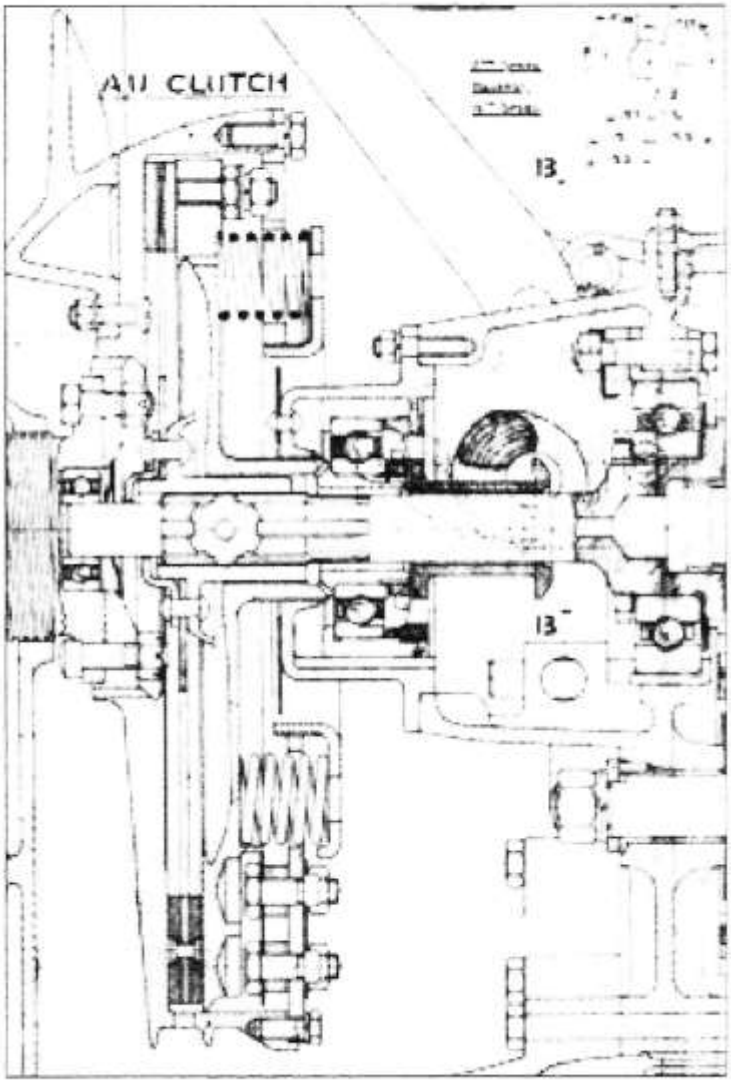

Figure 5: View of the 18HP clutch, 14HP shown above the centreline.

has been idle for some time, check by hand that the sleeve turns easily and smoothly. If not, remove the bearing cover plate, swill out any old grease with paraffin, and lubricate with a little engine oil as above.

A3 - ADJUSTMENTS

A.3.1 - Clutch Withdrawal

This adjustment is necessary from time to time to ensure that on the one hand, the clutch disengages sufficiently to allow clean gear changes when the pedal is depressed; and on the other, that it is not left partly withdrawn when the pedal is released, which would cause unnecessary wear of the lobes of the transverse shaft – and slipping!

Slacken the two nuts securing the eccentric sleeve carrying the transverse shaft to which the gear lever is attached and tap its triangular 'ear' **forwards** to increase the amount of withdrawal and **rearwards** to reduce it. The nut to the rear of the sleeve is clearly visible and accessible; however, the one in front is often overlooked - as evidenced by the number of 'ears' that have been broken off over the years in an effort to rotate the sleeve.

The sleeve should be adjusted so that the clutch pedal has at least half an inch free movement before beginning to withdraw the clutch. On all 14HPs except the model AU, this is easily verified by checking by hand that the withdrawal sleeve is quite free to turn with the pedal released. The vertical screw stop at the extreme off side rear corner of the sump casting (easily accessible from underneath the car) should then be adjusted (and locked) so that the pedal, when fully depressed, stops well short of its maximum travel. This should provide ample disengagement to permit clean gear changes (given reasonable skill on the part of the driver). Then re-tighten **both** nuts securing the sleeve.

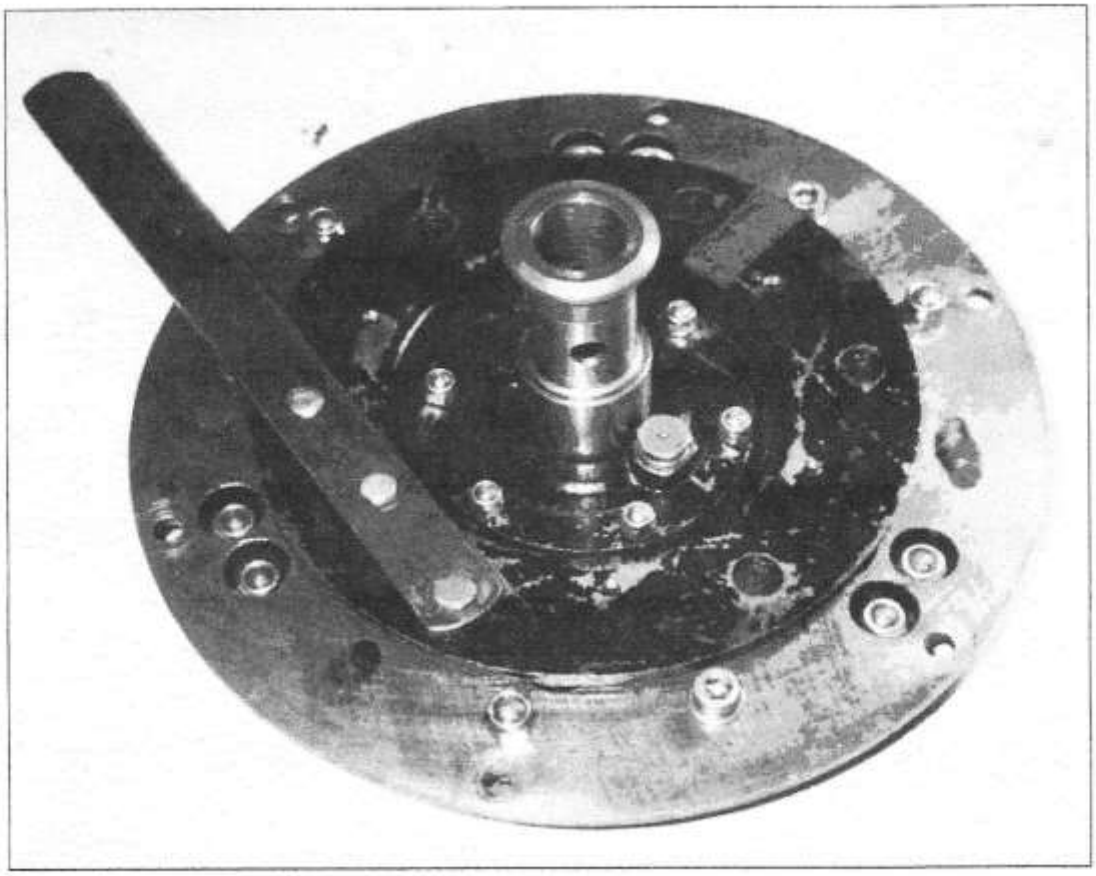

Figure 6: Showing the spring adjustment tool fixed in position.

NB: As the linings wear and reduce in thickness the pedal will gradually move rearwards; in which case the eccentric sleeve carrying the transverse shaft should be rotated backwards to restore the free movement specified above.

Should the linings become contaminated by oil from the rear crankshaft bearing, or from over-filling of the gearbox, some temporary improvement may be obtained by swilling them out with petrol after temporarily detaching the back plate from the flywheel - but wear rubber gloves – modern petrol is nasty stuff!

A.3.2 - Clutch Spring Pressure

On all cars except ADs and early AFs, the pressure applied by the six helical springs to the clutch linings may be adjusted after removal of the front floorboards and toe boards. The rear abutment plate is threaded into the back plate and provided with six holes which can be engaged by a special tool to turn it clockwise to increase spring pressure, and vice-versa.

As shown in Figure 6, the tool may be modified by using a centre M6 bolt to hold the tool in place, leaving both hands free to turn the tool round as required.

A.4 - REPAIRS AND IMPROVEMENTS

A.4.1 - Relining the clutch plate

Nowadays linings are often bonded to the plate; however, I have found that the bonding of linings can fail without warning and would recommend, when having the plate relined, to have the linings secured by rivets. For the auxiliary springs between the linings to be effective in providing a smooth initial take-up of drive - see A.4.3 - it is essential that the riveting should be to the original pattern.

When installing a relined clutch plate it is advisable, to fit a new matched set of helical springs, as uneven spring pressure can cause the judder on full engagement to which these clutches are prone. If you are not certain that the existing springs are matched it is a false economy to refit them.

A.4.2 - Transverse claw shaft

If the two lobes on the transverse shaft have become worn down (as is often the case), depressing the clutch pedal will not result in clean disengagement of the drive, making silent gear changes more than usually difficult. However, proper operation of the clutch can be restored by having the lobes built up by hard welding and reground to close to the original profile as seen in Figure 4.

This does not require the removal of the gearbox, only the removal of the pedals and their return springs as the lobes, even when restored, will pass through the gearbox extension housing once the eccentric sleeve is rotated to a suitable position.

A.4.3 - Leaf springs

If these - see Figure 2, item (C) - become broken, they may, depending on the owner's determination and patience, be replaced with the gearbox in situ.

A.4.4 - Auxiliary springs

A feature of the clutch plate assemblies is the interposition, within the thickness of the plate, of three flat section auxiliary spiral springs pressing the backs of the linings so

as to bow them outwards slightly to provide a very smooth initial take-up of the drive. On the 18HP cars there are four springs at 90 degrees; the pair opposite each other bowing segments of one lining forward; the other two, at 90 degrees to the first two, bowing segments of the other lining backwards. On the 14HP cars there are three springs at 120 degrees, free to float in the plate, each acting on the backs of both linings to bow their segments outwards.

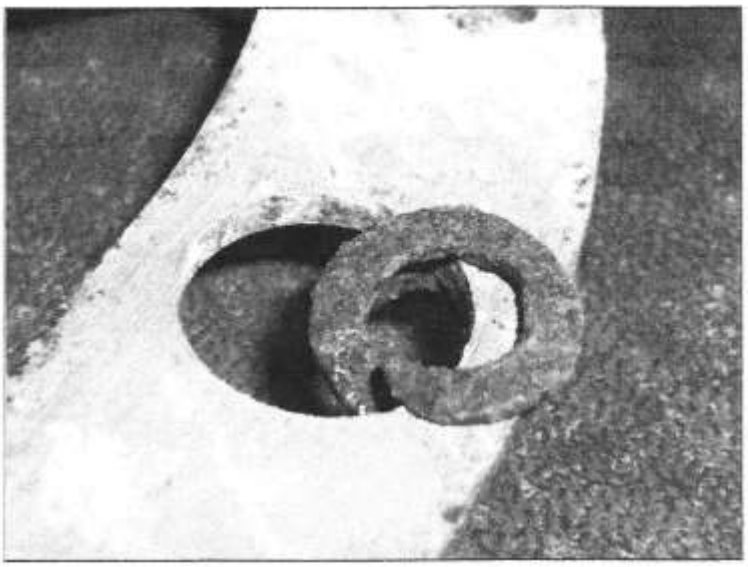

Figure 7: The 14HP clutch spring.

Whilst we Talbot owners should be grateful to Georges Roesch for designing such wonderful cars, it has to be admitted that his instinct for minimum cost could sometimes overcome his engineering judgment. For example, when 14HP clutches are relined it is often found that one, or all, of the three springs have been swung outwards by centrifugal force and got astride the plate, where they becoming effectively solid, cause uneven lining wear, and cannot act as intended. See Figure 7.

The problem can be entirely cured, and correct action of the springs maintained, by a simple modification. I can provide details of this, and of other worthwhile improvements which can easily be carried with the clutch on the bench, to any one who may be interested.

The Talbot Traffic Clutch

The NEW TRANSMISSION adopted for TALBOT CARS

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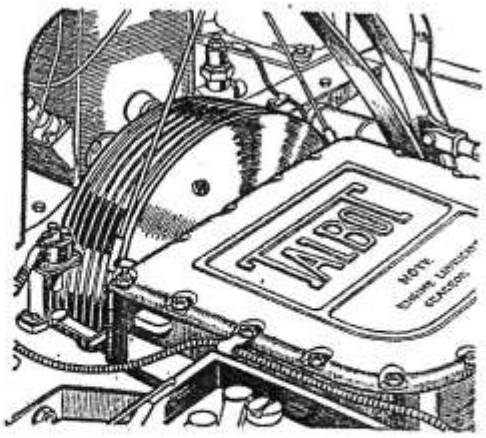
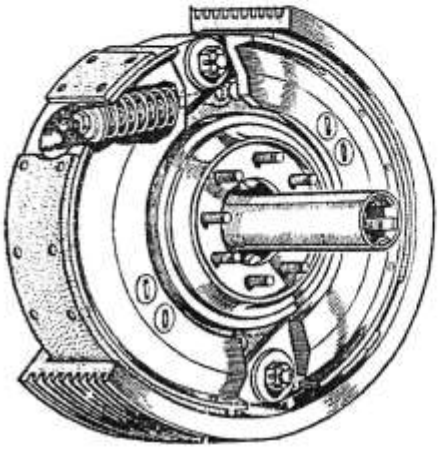


Showing the position of the automatic clutch on the Talbot, between engine and gear box

BRIEFLY the Talbot Traffic Clutch is a combination of an automatically operating clutch and a free-wheel with the Wilson self-changing gear box, and it has been developed by Mr. George Roesch, the talented chief engineer of Clement Talbot, Limited.

The construction of the clutch and of the free-wheel may be gathered from the accompanying illustrations. Bolted to a flange on the end of the crankshaft there is a member which forms the outer race both of the free-wheel and of a large double row roller bearing, while it also has attached to it a member pivoted to which are two heavy steel shoes to which friction linings are riveted. The shoes are pivoted at their leading ends, considering the direction of rotation, and their trailing ends are linked to an annular member which surrounds the outer roller race, and which is free to rotate slightly as the shoes expand under the action of centrifugal force. To these links the leading ends of the shoes are also connected by a link, surrounding the stem of which are two coil springs acting on a spring cap screwed on the end of the stem.



Floating shoes, free to move under centrifugal action, form the members of the automatic clutch, with which is incorporated a reversed free-wheel

Action of Centrifugal Force.

Thus, when the engine is at rest the action of the coil springs causes the shoes to be contracted towards one another, and, obviously, when the engine is running and the shoes are, therefore, rotating, centrifugal force tends to make them expand against the action of the springs. It should be stated that the arrangement of the links is such that the expansion of the two shoes is bound to be identical, for should one tend to lag behind the other it will be expanded by the floating action of the annular member to which the links are attached. So much for the driving member of the clutch, and, incidentally, the driven member of the free-wheel.

Surrounding the shoes there is a ribbed steel drum which is bolted to the inner member of the free-wheel, the latter having its centre extended in a hub-like formation to engage with splines on the end of the gear box shaft. The shaft, however, does not actually support this driven member of the clutch and driving member of the free-wheel, for the support necessary for it is afforded by the two rows of rollers lying between the races formed by the inner and outer portions of the free-wheel. Lying between these two rows of rollers there are four larger rollers spaced 90 degrees, and the inner member of the free-wheel has formed on it between the races of the smaller rollers four cam tracks which give a wedging action of the four larger rollers between the inner and outer members of the free-wheel, the rollers being held out into constant engagement with the outer member by means of small spring-loaded plungers. In other words, the free-wheel has two large roller bearings formed in one with it.

It is important to note that the inner member of the free-wheel is the driving member, for the free-wheel is not fitted in order to allow the car to "coast," but in order to prevent it doing so should the clutch shoes be out of engagement with their drum. When the car is over-running the engine at speeds below the main clutch full engagement, for example, when slowly descending a hill with the accelerator released, the road wheels are transmitting power through the back axle, propeller-shaft and gear box, to the inner member of the free-wheel, which is driven through the splines on the end of the gear box shaft, and, therefore, the inner member of the free-wheel drives its outer member through the four large rollers and, as the outer member is rigidly attached to the crankshaft, the engine also is driven.

The factors affecting the operation of the clutch, that is, the weight of the shoes and the strength of the springs holding them in the contracted position, are so arranged that the shoes begin to expand against the drum at an engine speed of about 400 r.p.m., and expansion is complete and the clutch is, therefore, fully engaged at an engine speed of about 900 r.p.m., that is, at maximum torque. The free-wheel, accordingly, only comes into operation as such when the car is running so slowly that the clutch is disengaged and when the driver wishes to accelerate. In such a case, as the driver depresses the accelerator the engine speeds up, and, therefore, the free-wheel is in operation for the short time that it takes the engine to attain the necessary speed for re-engagement of the clutch.

"Unidirectional Clutch."

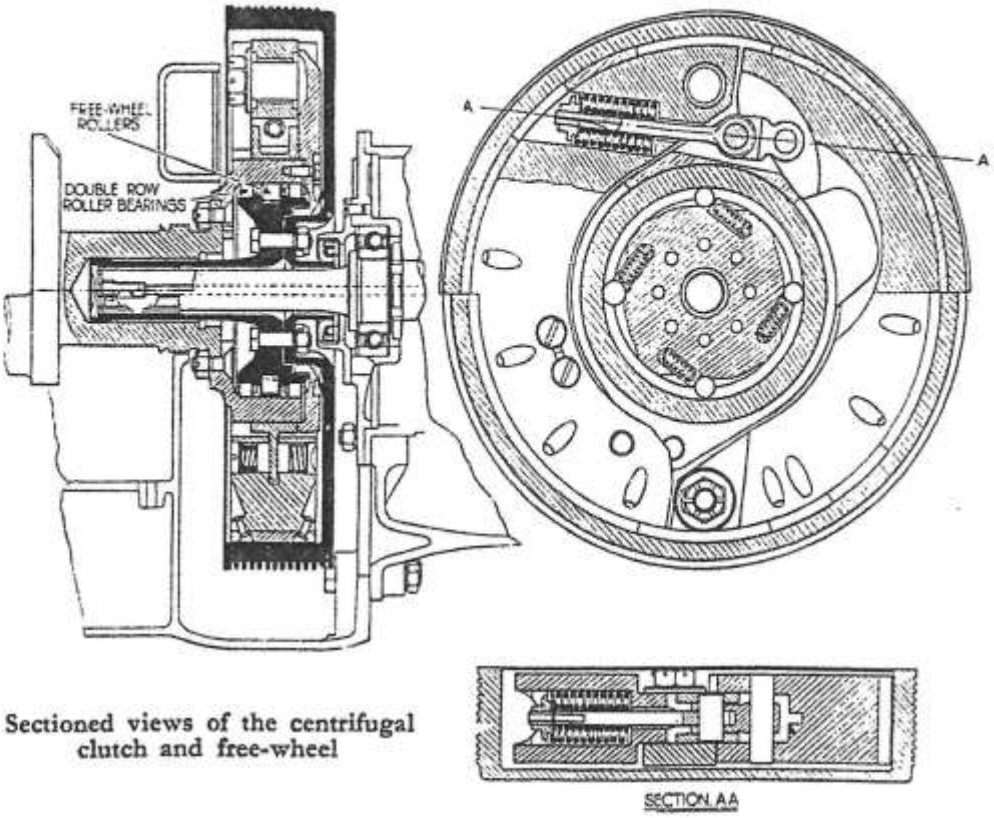
While this arrangement of the clutch and free-wheel may seem complicated in description, it is actually very simple, and its operation should easily be grasped if it is remembered that a better name for a free-wheel is a unidirectional clutch, and that its purpose in this case

is not to allow the car to "run faster than the engine," but to make it impossible for that to happen.

Another feature of the transmission is the addition of a camshaft to the Wilson box, connected to the operating pedal through a pawl-and-ratchet mechanism in such a way that when the pedal is depressed to engage a gear the preselector lever is advanced one step, so that while engaging one gear the next higher ratio is preselected. Thus, upward changes are made simply by depressing the pedal without any hand-manipulation of the preselector lever, although the latter can be used if desired, as for, say, passing direct from second to top gear.

For downward changes the preselector lever is moved by hand in the ordinary way, although it moves upwards to the next highest gear on depressing the operating pedal to engage the preselected gear. Therefore, if, for example, the driver has top gear engaged and wishes to change down to third gear, he preselects third gear and depresses and releases the operating pedal. This engages third gear, but the preselector lever meanwhile moves up to the top gear position, for it has preselected top gear, and if the driver wishes to change down to second gear from third, he then has to move the preselector lever for two notches, that is, to the correct position to pre-select second gear.

In practice both the clutch and the automatic preselection work admirably. The clutch engages so quietly and smoothly that it is impossible to detect the instant at which the drive becomes positive. Indeed, the feeling is very similar to that of driving a car with a fluid-flywheel transmission. In fact, the car can be held on a gradient by means of the accelerator only, so sensitive and smooth is the action of the clutch. Owing to the action of the free-wheel there is no possibility of the car getting out of control on a steep hill, as the braking power of the engine is always available.



Sectioned views of the centrifugal clutch and free-wheel

Clutch Slip.

The inter-action of the clutch and free-wheel results in the work of both being reduced to a minimum, for clutch slip is limited to the range of engine speed between 400 r.p.m. and 900 r.p.m., so that in normal driving clutch slip only occurs in starting from rest, or in taking up from a very low road speed. It follows, as already stated, that the free-wheel is only in action as such when the engine is running slowly and the car is stationary. It ceases to function immediately the clutch is fully engaged. But the free-wheel begins to operate as a solid one-way clutch transmitting the drive from the road wheels to the engine whenever the accelerator is released at speeds below the full and permanent engagement of the main clutch.

A brief description of the construction of the unit is as follows (see Fig. 25, page 47).

Bolted to the end of the crankshaft (1) is a member which forms the Outer Race (2) of the free-wheel, and of a large double row roller bearing (3). It also has attached to it a member (4), pivoted to which are two steel shoes (5) on which the friction linings (6) are riveted. The shoes are pivoted at their leading ends and their trailing ends are linked to an annular member (7) which surrounds the outer roller race (2) and which is free to rotate slightly as the shoes expand under the action of the centrifugal force. To these links (8) the leading ends of the shoes (5) are also connected by another link (9), surrounding the stem of which are two coil springs (10) acting on a spring cap (11) screwed on the end of the stem (9). Thus, when the engine is running and the shoes (5) rotating, centrifugal force tends to make them expand against the springs (10), whilst the arrangement of links (8) is such that the expansion of the two shoes (5) is bound to be identical, as if one tends to lag behind the other it will be expanded by the floating of the annuarl member (7) to which the links (8) are attached.

Surrounding the shoes is a ribbed steel drum (12) which is bolted to the inner member (13) of the free-wheel, the latter having its centre extended in a hub-like formation to engage with splines on the end of the gearbox driving shaft (14). The shaft, however, does not actually support this driven member of the clutch and driving member of the free-wheel (13), as the support necessary for it is afforded by the two rows of rollers (3) lying between the races formed by the inner (13) and outer (2) portions of the free-wheel. Between these two rows of rollers there are four larger rollers (15) spaced 90 degrees, and the inner member (13) of the free-wheel has formed on it between the races of the smaller rollers (3) four cam tracks which give a wedging action of the four larger rollers (15) between the inner (13) and outer (2) members of the free-wheel, the rollers being held out into constant engagement with the outer member (2) by means of small spring-loaded plungers (16). As has already been mentioned, the free-wheel is not fitted in order to allow the car to " coast," but to prevent

it so doing should the clutch shoes be out of engagement with their drum, and it should be remembered that the inner member of the free-wheel is the driving member.

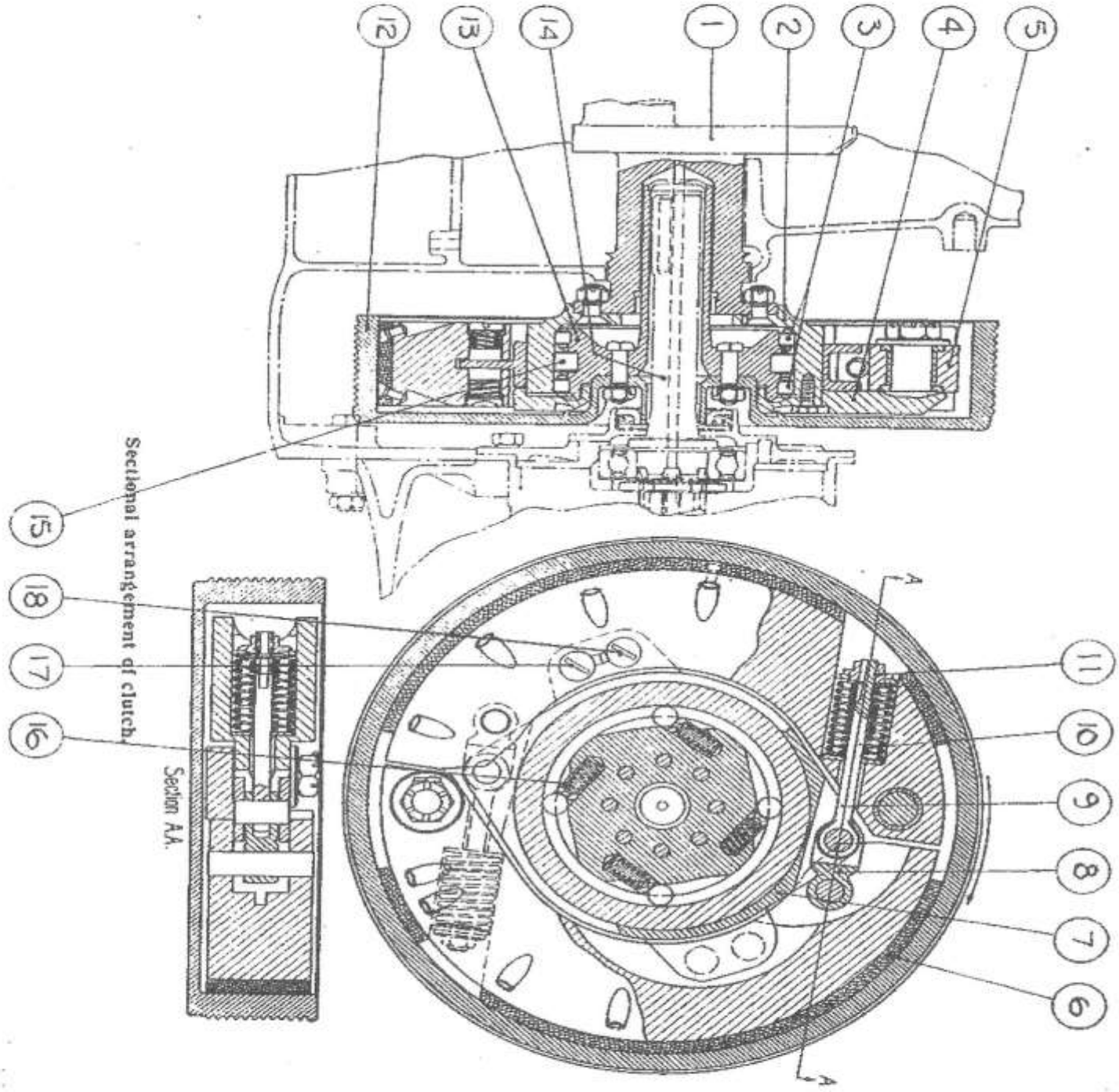


Fig. 25. Traffic Clutch.

Thus, when the car is over-running the engine at speeds below the main clutch full engagement speed (900 r.p.m.) as when slowly descending a hill with the accelerator released, the road wheels transmit power through the back axle, propellor shaft, and gearbox to the inner

member (13) of the free-wheel, which is driven through the splines on the end of the gearbox shaft (14) and therefore the inner member (13) drives its outer member (2) through the four large rollers (15), and, as the outer member (2) is rigidly attached to the crankshaft, the engine also is driven.

Adjustment

If at any time the clutch unit is dismantled for replacements, relining shoes, etc., the following points should be carefully checked before replacing gearbox.

All parts should go back exactly the same way as they came out to keep correct balance.

When shoes are relined the lining should be trued-up with shoes expanded to diameter of drum, both shoes being assembled on hub complete.

See that the drum remains stationary until the correct engine revolutions are obtained (600 r.p.m.). The clutch can be made to come into operation at this speed by adjustment of nut (11)—if it comes in too soon, that is at a lower speed than 600 r.p.m., turn adjusting nut (11) in a clockwise direction, but if it comes in at a higher speed, adjusting nut should be turned anti-clockwise.

Very Important.—On no account must the engine be started without first replacing the clutch drum.

Should a knock occur in the coupling, this is caused by the shoes coming into contact with the drum too quickly. It can be cured by turning in a clockwise direction adjusting screws (17 and 18). This tends to slow down the action of the shoes. This adjustment will not interfere with the speed at which the clutch comes into operation, the adjustment of which is described above.

Access to adjusting screws (17 and 18) can be obtained by removing plug in fly-wheel pit.

Notes